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Art. I.—CASE OF CYANOSIS.

Hypertrophy of the Heart, especially of the right divisions—Autopsy—Patescence of the foramen ovale—absence of the pulmonary artery—communication of the aorta with both ventricles.

BY J. S. ROHRER, M. D., OF PHILADELPHIA.

With remarks by the Editor.

To Professor Dunglison:—

Sir—In the course of the last week, I was requested by a medical friend to make an examination of a child, whose peculiarly *blue* appearance during life excited much attention. The lesions presented by examination have been deemed, by several anatomists to whom the heart has been exhibited, if not *unique*, at least as extremely curious and rare—I send you the case with some remarks for publication in your valuable journal, and would thank you to append to it your observations, with reference to similar cases.

Very respectfully yours,

J. S. Rohrer.

Chestnut street, Philadelphia, 30th July, 1840.

History.—In presenting this case, I regret exceedingly that no correct account of the symptoms could be furnished by any of the physicians in attendance. The parents of the child being poor were imposed upon by every species of cupidity and empiricism. A great number of persons were consulted at different times, but no correct or satisfactory information could be obtained from any. My medical friend, who requested me to make the autopsy, though highly intelligent, did not pay much attention to the case, and has but an indistinct recollection of the symptoms. He states that the child was subject to paroxysms of dyspnœa, and that the skin was perfectly blue.

The following particulars were obtained from the mother of the child. It was a male infant, *eleven months old*—large and well formed at birth—no blueness was observed the first day, the room being rather dark. On the second day a blueness was perceived which gradually increased until the third day, when it could easily be observed all over the body. The child seemed hearty, with the exception of the blueness of the surface; sucked well; in two weeks after, it began to decline; did not improve any more, but wasted away gradually, and never appeared to increase much in size. It had frequent spells of screaming; took fourteen drops of laudanum at a dose before it was three months old, which was subsequently increased in quantity. The laudanum was not discontinued until a short time before its death.

At six o'clock on the evening preceding its death, spasms occurred, which terminated its existence at one o'clock in the morning. Two weeks before its death vomiting supervened, which continued until a short time before its death.

The heart beat violently during the whole period of life; so much so that the pulsation could be perceived through the clothes; a pulsation was felt like the beating of the heart below the stomach near the hips; it is not recollected on which side; the pulse was very fast; the child moaned much and appeared in constant distress; would frequently have attacks as if it was suffocating; cold water applied to the feet would bring on those paroxysms immediately; had a throbbing of the arteries of the neck; appetite very good during the whole period; would eat frequently so much as to cause vomiting; was intelligent for its age; could not stand upon its feet; had no strength in its limbs; in those paroxysms would hold its breath for a long time and turn up the eyes.

Was blue at all times, but occasionally purple, the nails on the hands and feet like indigo; had no bowel complaint, nor fever, and sucked well until the last.

The breathing was not very hard, except in the paroxysms, to which it was subject. As many as fifteen doctors were employed, the last of whom was a Homœopathist.

Necroscopy.—The heart at its base is six inches in circumference; its length from the apex to the semilunar valves of the aorta, two inches and a half.

The right ventricle, at the point where the pulmonary artery should have originated, is half an inch in thickness, and the middle and lower portion of it is but one fourth of an inch.

The left ventricle is uniformly one fourth of an inch in thickness.

The right auricle is much distended, being about three times as large as the left auricle. The musculi pectinati are very strongly developed.

The lungs are normal.

The left auricle is unusually small, and has five pulmonary veins.

The foramen ovale is deficient in several parts; the right auricle communicating with the left by different apertures. The valve of the foramen, for instance, is not closed, and is one sixth of an inch in diameter. At the upper and lateral portions of the foramen ovale, are two more foramina, on each side, both of which would admit a common quill. On each side of the eustachian valve are one or two orifices, the largest of which would admit a blow-pipe.

The valvulæ tricuspides are of a scarlet colour, slightly tumefied, and cartilaginous.

The capacity of the right ventricle is much increased, and about four times as large as the left ventricle. Whilst the right ventricle would hold an ounce of fluid, the left would not hold more than two drams.

There is a deficiency in the upper part of the septum between the ventricles. A probe introduced into the aorta will pass with facility into each ventricle, and thus a communication is established between the two great cavities. This deficiency in the septum forms a foramen of half an inch in diameter, which is so placed that the communication between the right ventricle and aorta is more perfect than between that vessel and the left ventricle.

The *columnæ carneæ* of the right ventricle are greatly developed—thus corresponding with the superior developement of the *musculi pectinati* of the right auricle.

The mitral valves are normal.

The internal membrane of the left ventricle natural in thickness and slightly tinged with yellow.

The pulmonary artery is much smaller than common, not exceeding one line in diameter, and *does not penetrate to the cavity of the right ventricle,*

but is suddenly *closed, ending in a pouch* near the root of the aorta, where it should have originated, viz. at the anterior and left part of the basis of the right ventricle. As it proceeds obliquely upwards in its proper course, on the left side of the aorta, it divides into two branches, at the root of which, the *ductus arteriosus* is inserted. Thus there is no direct communication between the *pulmonary artery* and the cavity of the heart. The branches of the pulmonary artery are very small, and will with difficulty admit the end of a probe.

The ductus arteriosus is one sixteenth of an inch in diameter.

The aorta as it arises from the ventricle, being placed immediately over the septum between the ventricles, is full half an inch in diameter, and suddenly diminishes to the usual size where the arteria innominata is given off.

The semilunar valves of the aorta are normal, closing entirely the aortic orifice.

Remarks.—The anatomical lesions presented in the preceding case are very remarkable; the most striking of which is, that but one vessel, namely, the aorta, communicated directly with the cavities of the heart, whilst the pulmonary artery terminated in a *cul de sac* in the muscular tissue of the right ventricle. The question at once arises, by what means was the pulmonary circulation maintained? The present state of physiological science compels us to suppose that such a circulation is essential to life, and that in this instance it must have been effected through some unusual channel. May not the blood have been conveyed in a retrograde course from the aorta through the ductus arteriosus to the pulmonary artery and by this vessel to the lungs? The function of the right ventricle in this case being vicarious in a great degree to that of the left, caused great hypertrophy of the parietes and dilatation of the cavities of the right side of the heart and correspondent atrophy of the left.

The aorta, it will be seen, was also much dilated. The question next arises, how did this phenomenon take place? It is plain that the blood being received on the right side of the heart, was forced through the foramen ovale into the left auricle, and through the tricuspid valves, into the right ventricle. The blood being thus propelled, the left ventricle received a portion of it from the left auricle through the mitral valves and the *opening of the septum*, whilst the greater portion passed into the left ventricle through the opening of the tricuspid valves.—The blood having thus arrived in both ventricles, the simultaneous contraction of which forced it at once into the aorta, their combined force acting upon that vessel gradually dilated it, in consequence of the impetus being spent on its parietes. It will be recollected that the dilatation did not extend beyond its great curvature.

Upon consulting several authors I have not been able to find any case in which the entire communication of the pulmonary artery with the right cavities was wanting. Several cases are detailed, in which a similar lesion of the septum of the ventricles occurred, and some cases are narrated in which the orifice of the pulmonary artery was extremely contracted; but no instance is cited in which there was congenital absence of *direct communication* between the right ventricle and pulmonary artery.

The learned editor of the Medical Intelligencer would confer a great obligation upon myself and the profession if he would have the kindness to communicate his observations on this subject.

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Remarks by the Editor.

The pathological appearances found on the dissection of those who have died of cyanosis or kyanosis, are diversified and curious. All permit the admixture of venous with arterial blood so as to give rise to the colour of the surface so strikingly exhibited in the case described by our correspondent.

Gintrac,[1] who was professor of anatomy and physiology at Bordeaux, has collected the appearances presented on the dissection of fifty-three cases. In twenty-two of these, the aorta was found to arise from both ventricles. In thirty-three, the foramen ovale was open; in fourteen, the ductus arteriosus was wanting; in four, the heart was single, consisting of one auricle and one ventricle; in five, the ventricular septum was imperfect; in twenty-two, the pulmonary artery was contracted; in five, that vessel was obliterated; in one, the aorta was obliterated; and in four, the aorta arose from the right ventricle, the pulmonary artery from the left.

The various malformations of the heart have been well investigated by different pathological writers, and especially by Meckel,[2] and Hope, and more recently still by Warnatz of Dresden—the last writer having described them in reference especially to kyanosis.[3]

The various malformations as given by Dr. Hope, are as follows: 1. The heart single, like that of a fish consisting of one auricle and one ventricle, from which a trunk originates that presently divides into pulmonary artery and aorta; 2. Two auricles and one ventricle. In one case the patient attained the age of 22. 3. The foramen ovale remaining open, which is the most common malformation. 4. The foramen ovale and ductusarteriosus both remaining open. 5. The foramen ovale and ductus arteriosus open and the pulmonary artery obliterated at its origin. In one case, the cavity of the right ventricle was nearly obliterated, and in two others the septum of the ventricles was perforated. To this division the case, described by Dr. Rohrer, would seem to belong. 6. Ventricular septum deficient; auricular imperfect. 7. Ventricular septum deficient at the aortic orifice, so as to leave a common opening into that vessel from both ventricles; this malformation being generally accompanied with contraction of the pulmonary artery, frequently with an open state of the foramen ovale, and occasionally with obliteration of the pulmonary artery and patescence of the ductus arteriosus. 8. Ventricular septum perforated towards the base, associated with contraction of the pulmonary artery and patescence of the base. 9. Foramen ovale open, and pulmonary artery arising from both ventricles, and giving off the descending aorta; whilst the ascending aorta arises in the usual way. 10. Aorta arising from the right ventricle, and the pulmonary artery from the left; the foramen ovale and sometimes the ductus arteriosus remaining open. 11. The right auricle opening into the left ventricle instead of into the right; and the ventricles communicating by an aperture immediately below the aortic valves. The foramen ovale open.[4]

The heart in the case described by our correspondent appears to resemble that of the higher reptiles (höheres Reptilienherz, of Meckel) the ophidian, saurian, and chelonian, which consists of two auricles with a partitioned

[1] Observations et Recherches sur la Cyanose ou Maladie Bleue. Paris, 1824.

[2] Handbuch der Pathologischen Anatomie, von Johann Friedr. Meckel, u. s. w. Band 1, S. 419. Leipz. 1812.

[3] Art. Kyanosis, in Encyclopäd. Wörterb. der Medicin. Wissensch. Band xx. S. 608. Berlin, 1839.

[4] Treatise on the Diseases of the Heart and great vessels, and Mayo's Outlines of Human Pathology, reprinted in Dunglison's Medical Library. Philad. 1839.

ventricle or a single ventricle. Meckel[1] refers to many such cases described by Pulteney, Hunter, Sandifort, Nevin, Abernethy, Cruikshank, Prochaska, Caillot and Duret, Corvisart, &c. and Warnatz[2] to others by Kreyssig, Hartmann, Tiedemann, Gintrac, Senac, Wolf, Lexis, Spittal, Bird, Beckhaus, Hunter, and others; but although these cases greatly resembled each other in the fact of a ready communication existing between the ventricles, they differed greatly in the details.

In Lexis's case,[3] the aorta arose from the ordinary place in the left ventricle, which was more than usually developed; at the same time, there was an opening through the septum ventriculorum in a straight line with the embouchure of the aorta, which permitted a free communication between the right and the left ventricle, in such sort that one half the aorta might be considered to open into the right and the other into the left ventricle. The pulmonary artery was greatly diminished in size.

In a case related by Bird,[4] besides hypertrophy of the heart, a ready communication existed between the right ventricle and the aorta, at the place where the pulmonary artery ought to have been, and at the same time the carotid arose from the left ventricle.

In another case, related by Beckhaus,[5] of a "blue" child, but a slight trace existed of the septum ventriculorum; the valve of the foramen ovale, which was open, and the eustachian valve were present; and the ductus arteriosus was divided into two branches, one of which went to the right and the other to the left lung from the aorta; the pulmonary artery was wholly wanting.

Generally, the pulmonary artery has been found of very small size, (*Abernethy, Sandifort, Stenson, Hunter, Nevin, Caillot and Duret, Hope.*) Duret and Caillot[6] not only found the mouth of the pulmonary artery very narrow, and the coats thinner than usual, but the artery itself entirely impervious, and the ductus arteriosus wholly obliterated. Ramsbotham[7] found the pulmonary artery entirely wanting, its place appearing to have been supplied by the bronchial arteries.[8] Romberg,[9] in a case of cyanosis, found the aorta near the heart terminate in a *cul-de-sac*. It had received its blood through the ductus arteriosus from the pulmonary artery which was of unusual size. The child lived four days.

It would appear, therefore, from all the pathological investigations which have been instituted, that the main causes of cyanosis, or of the admixture of venous with arterial blood, are; *first*, the want of closure of the foramen ovale; *secondly*, the patescence of the ductus arteriosus beyond the proper period. *Thirdly*, the patescence of both the foramen and the duct beyond the normal time. *Fourthly*, an abnormous opening or openings in the septum between the ventricles, which have thus a free communication with each

[1] Op. Cit. S. 427.
[2] Loc. citat. S. 610.
[3] Hufeland's Journal für 1835, St. 12.
[4] Horn's Archiv. für 1821, Hft. 1.
[5] De Deformationibus Cordis Congenitis, &c. Berol. 1825, cited by Warnatz.
[6] Meckel, and Warnatz Op. citat.
[7] London Medical and Physical Journal, Jan. 1829.
[8] See, also, Müller, in Horn's Archiv. für 1822, Hft. 3. Hunter, Medical Commentaries by Duncan, ix. 325.
[9] Dissert. de Corde Vasisque Majoribus, &c. Berol. 1824.

other and with the aorta; and, along with this malformation, narrowness or obliteration of the pulmonary artery. *Fifthly*, defective formation of the heart, which consists of but one auricle and one ventricle; and *lastly*, abnormous origin of the vessels from the heart.[1]

Art. II.—A LECTURE ON MONSTROSITIES,

Delivered at the Middlesex Hospital School of Medicine, Feb. 22, 1840.

BY JOHN NORTH, ESQ.

Lecturer on Midwifery, and the Diseases of Women and Children.[2]

(Concluded from page 137.)

Gentlemen:—In resuming the subject of anomalies of structure, I shall first speak of the congenital softness of parts which are naturally hard.

The bones are the only organs in man or animals in which a deficiency of hardness is found. You know that all parts of the osseous system are originally soft membranes; that those membranes, in the second stage of developement, become cartilaginous; and, finally, that this cartilaginous state is converted into bone. Bone in man, as well as in animals, is, generally speaking, formed in the latter parts of intra-uterine life. It follows, then, as a necessary consequence, that if those parts which ought ultimately to become bones, are retarded or arrested in their developement, either the membranous or the cartilaginous condition may remain longer than usual, or even remain permanent through life. Whether these will retain a membranous or a cartilaginous condition, must depend on the period of intra-uterine life at which the arrest or retardation of developement occurs. Either circumstance may take place in several bones, but usually it occurs only in one, or a portion of one bone. The bones of a child's head, for example, have not unfrequently been found arrested in their developement, in consequence of pressure. In some remarkable cases such pressure has been inflicted by exostosis, or a preternatural growth of the pelvic bones of the mother. These examples are remarkable, inasmuch as they realise, in the species in which they are observed, the normal condition of other species belonging to classes beneath them in the zoologic scale.[3]

Anomalies arising from an induration of parts which are naturally soft, are attributable to an excess of developement. Nearly all the soft parts have been found osseous, but usually as the result of disease. Individuals are occasionally seen, the whole surface of whose bodies, instead of being covered with skin, is covered with scales resembling those of a fish. Such persons have been called porcupine families. This condition constitutes a species of disease, of which there are several varieties, termed *ichthyosis*.

There are various anomalies in the situation of parts, which arrest attention from their practical importance; they can only be explained by the theory of eccentric developement. Those organs are most liable to anomalous changes of position, which, in the early periods of fœtal life especially, are but slightly united to the adjoining parts. Displacement of the brain is by no means uncommon, constituting *hernia cerebri* or *encephalocele*. The brain may protrude at all the sutures, and between those portions of bone, the union of which takes place at so early a period of embryonic life

[1] Warnatz, Op. citat. S. 616.

[2] London Lancet, March 14, 1840, p. 913.

[3] Otto, "Lehrb. der Path. Anat." mentions a very remarkable example of this kind. A woman, who had exostosis of the pelvis, gave birth to four children, in each of whom a small part of the cranium was depressed and not ossified.

that their primitive separation has only recently been known. For example, the brain may protrude between the two portions of the occipital bone, which ought to become permanently united. St. Hilaire mentions, that in one case a large portion of the brain protruded between the two halves of the occipital bone, which remained severed in consequence of an arrest of developement; it was mistaken for a common tumour, and was removed by a surgeon. The child died in a few hours after the performance of this ill-judged operation. Such children usually die soon after birth. Displacement of other parts not unfrequently occurs; for instance, of the lungs and the heart. The heart has been known to protrude through the parietes of the thorax. Most of these children are incapable of living, but a few have lived for many months. The digestive organs are frequently displaced, as well as the heart. Sometimes the diaphragm has been perforated, so as to admit the abdominal viscera into the thorax. Exomphalos, or umbilical hernia, may occasionally arise after birth, in consequence of the digestive viscera being pressed against the recently-formed and tender navel; but generally exomphalos is a primitive malformation, and the part protruded a portion of the small intestines; but sometimes a part of the omentum, or large intestines, or the liver, protrudes, in consequence of the abdominal parietes being deficient. The whole of these anomalies arise from the persistence of a fœtal condition. You are aware, from observations I formerly made when upon the subject of embryology, that till about the third month of utero-gestation the intestines are collected together, and lie outside the abdominal cavity. They form a mass inclosed in the sheath of the funis, which, at that time, is very large; and which, at that early period of embryonic life, is the substitute for the yet unformed abdominal parietes. When the abdominal parietes are almost entirely formed, there is scarcely any opening left but that at the umbilicus, through which a portion of the intestine may obtrude. The majority of children, if born alive with umbilical hernia, die a short time after birth. Occasionally, where the hernia is very small, and unconnected with other malformations, the child, if properly managed, may continue to live and enjoy tolerable health. Various internal displacements of the digestive organs are occasionally found, many of which are not otherwise important than as showing that they are almost always the result of the persistance of some stage of embryonic life.

An anomalous position of the urinary and genital organs is not very uncommon; the bladder may protrude through an opening at the pubis, or the recti muscles on either side; its displacement through the pubis is not unfrequent; the bladder does not quite protrude, but looks like a subcutaneous tumour more or less above the pubis; this is called *extroversion* of the bladder. The bladder is not merely displaced, but its developement is arrested, its mucous membrane is turned out, and it is this which gives it the appearance of a reddish, soft tumour, opposite the symphisis pubis, or a little above it; at the upper portion of the tumour are generally found two small apertures, which are the openings of the ureters; through these openings the urine distils *guttatim*. It so happened that the first case I ever dissected presented a malformation of this kind; and here [presenting it] is a drawing of it taken at the time:—The anterior portion of the bladder is wholly wanting. The tumour, in these cases, projects more or less, and may be diminished by pressure; so long as the child is quiet the tumour is little, if at all, above the surface of the abdominal integuments; but when the child cries or strains, it is considerably elevated above them. In several cases where there has been this extroversion of the bladder, the umbilicus has been entirely hidden by the tumour, or has, perhaps, been lying under the protruded portion of the bladder; and hence it has been thought that certain children have been born without a navel, an occurrence which is physiologically incredible. As the urine is distilled *guttatim*, through the orifices of the ureters, which are represented in the drawing, the function of the urethra is not called into action; and according to a physiologi-

cal law the urethra becomes impervious. The same remark applies to all canals, whether blood-vessels or any other tubes; if they are not called upon by nature to perform their function of transmitting the fluid that should naturally pass through, then they cease to be canals. The opening at the pubis or recti muscles, which is found in cases of extroversion of the bladder, is clearly and unequivocally an arrest of developement; nature has stopped in her work; in fact, the developement is not completed.

Extroversion of the bladder is always a serious malformation, for the discharge of urine is involuntary, and constantly going on from the ureters.

An anomalous situation of the testicles is neither uncommon nor practically unimportant. The testicles may descend sooner than usual, from an excess of developement, nature having terminated her processes more rapidly than she generally does; more frequently, however, the testicles do not descend into the scrotum at the usual time, from an arrest of developement; they may not descend till the ninth month of pregnancy, or even for weeks, months, or years, after birth, or they may never descend at all. They are often arrested at the inguinal canal for several years. In all these cases there is a persistance of the fœtal condition, and the situation of the testicles is analogous to the natural structure of various animals, in many of which the testicles remain permanently in the abdomen. None of these cases affect the generative powers of man; indeed, the popular belief is, that men whose testicles do not descend into the scrotum, are generatively more vigourous than those whose testicles are in their natural situation. If the testicles remain permanently in the abdomen, no external examination could convince the inquirer that those organs existed at all; and no doubt it is to this circumstance that we must refer those cases in which it has been imagined that men were capable of exercising their generative functions without testicles. Cases of anomalous situation of the testicles have occurred which are extremely important; at the age of puberty the testicles have appeared in the form of small tumours at the groins, and serious mistakes have arisen. If, at the age of puberty or before, a boy complains of a small swelling in the groin, be careful before you make up your mind as to the nature of the case or the treatment to be adopted; examine the scrotum, and ascertain whether the testicles are down. I have known cases in which the testicles forming tumours at the inguinal ring, have been mistaken for hernia; a truss has been applied, and inflammation and great suffering have been produced by the ignorance or carelessness of the practitioner. I shall afterwards enter into some details upon this subject.

Displacement of the kidneys is by no means a rare species of anomalous position of parts; one kidney is occasionally found, not in its natural situation, but in the pelvis. This is worth observing, because it refutes a physiological error. In cases of this kind the supra-renal capsule is retained in its natural situation, showing that the opinion of certain physiologists, who assert that the supra-renal capsule and the kidney are dependent upon each other, is incorrect; for when the kidney is in the pelvis, the supra-renal capsule retains its normal situation, condition, and size.

There are various displacements of organs which are not contained in the digestive cavities; for example, club-feet. Club-foot is, however, very frequently associated with other malformations. In 38 cases of anomalous structure, at La Maternité, of various kinds, Chaussier observed club-foot in 37 of them. This malformation may exist alone, but usually it is associated with other and more important organic deviations. Generally speaking, we see club-foot in acephalous children, *i. e.* monsters born without a brain, or merely a rudimentary brain.

Club-foot frequently arises from mechanical pressure inflicted during pregnancy, but generally there is an imperfect developement of the bones of the tarsus; it also occurs from rickets during intra-uterine life. When the foot is turned in, which is the most common species of club-foot, it arises from a persistance of the fœtal condition, for at an early period of embryonic

life the foot is turned more or less inwards. Here we find another proof of the curious fact, that anomalous structure in man represents the natural structure of a great many animals. Sometimes the foot is thrown downwards, (the pes equinus, of authors) another example of arrest of developement occurring at a very early period of intra-uterine life, and again exhibiting in man the natural structure of many animals. Many mammiferous animals have their feet directed vertically downwards, and only rest in standing on their toes and nails. Similar distortions are occasionally seen in the hands.

The hair of the eyelashes is sometimes turned in at birth, constituting what is termed *trichiasis*, which occasionally occurs also after birth. The hairs being turned in on the globe of the eye, of course cause great irritation. It is not my object to speak of the treatment of these cases.

The blood-vessels, nerves, and muscles are subject to various anomalies of position. It is almost impossible to dissect a body without finding variations in the origin and termination of muscles, and in the course and distribution of blood-vessels. The latter are extremely common, some of these variations being of no moment, while others are very important in reference to practical surgery. The surgeon, when about to perform an operation, presumes that the blood-vessels to be involved in it are in their natural position; but he should know the possibility of this not being the case, and therefore will be careful to make an examination, and prepare for any accident which may arise from their abnormal situation.

All organs, however intimately connected with adjoining parts, may be displaced at birth, and most of these occurrences are explained by an arrest of developement, so that that becomes a permanent condition which, normally, should be only temporary. Sometimes in exomphalos, or congenital umbilical hernia, the organs have not quitted their natural position—they have never occupied it. The protruded part or parts have not escaped from the abdomen, as is generally asserted; congenital umbilical hernia is generally formed in a different way; from an arrest of developement the protruded parts have never arrived in the abdominal cavity. Sometimes, however, this species of hernia occurs after birth, the intestine having protruded from its natural place, and passed through a more or less dilated opening, or an opening which remains beyond the usual period.

The jaws are sometimes so narrow that the dental arch is incapable of holding all the teeth it is naturally destined to contain. This is not of practical importance; it is merely one item in the general account, illustrating the curious physiological fact of anomalous structure in man so frequently resembling the normal structure of animals; for in many animals we find the teeth standing one before another, from narrowness of the jaw. Another singular anomaly with respect to the teeth is, that they are sometimes merely fixed in the gums, resembling many fish, where they are not fixed in bony alveolar processes, but simply adhere to the soft parts. This supports the opinion of de Blainville and other physiologists, who assert that the teeth are dependent on the integuments rather than on a connection with the osseous system.

The whole of the lymphatic system is so uncertain in its distribution, that no detail has ever been attempted of it. Less commonly, but still not very rarely, we find similar variations in the distribution of the arteries and veins. The vena azygos, for example, varies so greatly in its course as to be scarcely twice alike. The jugular veins, again, are by no means constant in their course. The system of the vena portæ offers many variations in its distribution. The arch of the aorta and the vessels which arise from it often vary in their direction. Numerous other deviations exist occasionally in the distribution of blood-vessels in the human subject.

The knowledge of some of these facts is of practical importance. For example, neither the distribution of the veins nor the arteries at the bend of the arm is always the same. The common operation of venesection is

generally performed upon the median cephalic vein. If the median basilic vein is chosen, the artery may be wounded. And the lancet ought never to be introduced before the situation of the artery is ascertained; for the division of the brachial artery into the radial and ulnar sometimes takes place much higher up than usual. Sometimes the brachial artery divides at the upper part of the arm, and then the branches which proceed from it correspond with the basilic and cephalic veins. Portal observes, that where there is this unusual bifurcation of the brachial artery, it is generally associated with a similar high division of the crural artery.[1] Again, the obturator artery generally arises from the hypogastric, or internal iliac artery; but not unfrequently it is given off by the epigastric artery. This is an irregularity in the distribution of blood-vessels of importance in reference to the operation for hernia.

Sometimes the ureters open into the urethra, and in such cases the bladder is generally absent. This is the natural structure of many animals. The ureters may open into the vagina or rectum. The vas deferens may open into the bladder or ureters. The vagina, or neck of the uterus, has been known to open into the bladder or rectum. In the latter case a woman may conceive and bear children. The anus has been known to enlarge sufficiently, with some laceration of the perineum, to admit the passage of the child during labour. In one case related by Portal, a woman had apparently no vagina, but only a small opening for the passage of the urine, and she had always menstruated by the anus. She was impregnated by the rectum, and at the end of pregnancy the very small opening near the pubis, by means of which it was impossible she could have been impregnated, enlarged, and delivery took place by the natural passage. The intestinal canal has very frequently been known to open at some other part than the anus. In those cases there is a deficiency of the intestine, the gut ending where the anomalous opening is. This is important, as I shall afterwards mention, in reference to the treatment of imperforate anus.

Irregular openings of the male urethra are by no means uncommon. I have seen three instances. Sometimes it opens at the upper part of the penis, constituting a species of malformation technically termed *epispadias;* at other times the opening is on the lower part of the penis, constituting another species of malformation, called *hypospadias.*

Occasionally, some of the natural openings of the urinary organs are found wanting. Most of these anomalies arise from a persistance of the early structure of the embryo, and represent in man the natural state of inferior animals. The intestines have been known to terminate in the bladder. The expulsion of the urine, mixed with meconium, is a clear proof of that phenomenon. In most cases death is the result of these malformations, but sometimes infants have lived for months with them. A remarkable case occurred to Fournier, of the rectum opening into the vagina. He was called in by three pupils, who had been attending a woman in labour for three days. Difficulties arose; the bowels were much constipated, and the patient had not had a motion for some time. He desired a glyster to be thrown up; the pupils attempted to administer it, but failed, without knowing the reason. Fournier examined the patient, and found no anus, and on introducing his finger into the vagina, found that the end of the rectum was loose, and pressing upon the womb, as it was filled with fæces. There was no spincter ani. The opening of the gut was as large as its diameter. A canula was introduced, and the rectum cleared by a glyster; it was loaded with scybala and cherry-stones. The labour terminated well and easily.

Any of the external openings of the body may be wanting. The vagina may be completely imperforate, and so may the hymen. In these cases the menses have been retained; symptoms of pregnancy have existed, and

[1] This is an error on the part of M. Portal. A high division of the crural artery is infinitely more rare than that of the brachial.—*Sub. Ed. L.*

serious mistakes have been made in practice, which I guarded you against early in the course.

In other cases the urethra is imperforate, either at the glans penis only, or a large portion of the canal may be impervious. I have seen two cases in new-born infants, in which the orifice of the urethra was merely covered with a delicate membrane, which was removed without the slightest difficulty. But when the urethra is thus closed, we cannot be certain, before this slight operation, how far it is imperforate, or how serious the case may be. If the passage be wanting through a considerable part of the canal, the case is scarcely remediable. In some cases the opening of the nostrils has been found closed. Sometimes, as in the urethra, the obstruction merely consists of a thin, delicate membrane; at other times there has been a permanent adhesion of the nostrils. Sometimes the iris is imperforate, in consequence of the persistance of the two original halves of the membrana pupillaris. Sometimes the membrana pupillaris disappears spontaneously after birth, but that is very rare. It may always be assumed that the child will remain blind, unless the membrana pupillaris be removed by operation, as it once was by Cheselden in a case of this kind. Imperforation of the os uteri is not very uncommon. In some cases this anomaly arises from a membrane closing the os; in others, from the lips being united. Here is a specimen where it is scarcely possible to introduce a needle into the os uteri. Of course, although the os uteri be imperforate, the menstrual fluid will be secreted, but cannot be discharged, and then it will be necessary to make an incision into the uterus, as has been done by Delpech and others, with success. The uterus may expand to the size of pregnancy, from the gradual accumulation of the retained menses in its cavity, and all the ordinary phenomena of utero gestation be produced. Incisions have been made in many such cases into the uterus, and the patients have subsequently done well, and borne children. All canals lined with a mucous membrane, continuous with the skin, are liable to have their natural openings imperforate. This organic condition, which is frequently referred by pathologists to disease, is really attributable to an arrest of developement, from the persistance of a state which naturally ought to be only transitory.

The persistance of the ductus arteriosus, or foramen ovale, after birth, is by no means unimportant or uncommon. Either of these anomalies is occasionally found without other malformations of the vascular system, but this is rare; usually the heart is malformed. The embryonic or fœtal structure remains, and resembles the natural structure of reptiles. The persistance of the inter-auricular orifice and ductus arteriosus does not always, or even commonly, produce any particular symptoms during the first days of life, provided it do not oppose the perfect oxygenation of the blood; but such malformations sooner or later cause a disease called cyanosis, which I shall describe in a future lecture.

A complete inversion in the situation of the thoracic and abdominal viscera, the blood-vessels, and nerves, occasionally exists; all those organs which are ordinarily on the right being placed on the left side. Complicated as this deviation from the general plan of nature undoubtedly is, no disturbance of function is caused by it; and this well-known fact admits of an easy explanation. If the heart, for example, be placed on the right side of the thorax, as the situation of all the great blood-vessels is also inverted, and as they preserve their normal relations with the different cavities of the heart, the circulation of blood is not disturbed. If the spleen be placed on the right side and the liver on the left, the process of digestion is not interrupted, inasmuch as the position of the stomach is also inverted, and the normal connection between these organs still remains. There are many examples on record of such complete transpositions of all the viscera, without injury to the health of the individuals. An ingenious attempt has been made by Serres[1] to explain the cause of these transpositions. He states

[1] "Recherches D'Anatomie Transcendante," &c. p. 108, et seq.

that his embryological observations lead him to infer that the liver is in fact a true centre, around which all the other organs range themselves in a regular manner. That the unequal developement of the two lobes of the liver, which are primarily equal and symmetrical, exercises a direct or indirect influence upon all the other thoracic and abdominal organs, and determines their definitive situation in both cavities: and that if the developement of the lobes of the liver deviates from the natural and ordinary course, a transposition of the thoracic and abdominal viscera necessarily results. The merit of plausibility may, perhaps, fairly be given to this speculation of M. Serres, but so far as I know it stands much in need of confirmation.

The subject of hermaphrodism occupies from 60 to 80 pages in the work of Geoffroy St. Hilaire. All I can say is this, that although we see many instances of true hermaphrodism in the animal and vegetable kingdoms, no such cases have ever existed in the human subject; no human hermaphrodite, in the proper sense of the term, has ever existed; not a single so-called hermaphrodite in man has even been capable of performing the sexual functions of both sexes. All the alleged cases have merely arisen from various malformations, either of imperfectly formed men or imperfectly formed women. In consequence of malformations of the genital organs, girls have been educated for boys, and *vice versâ*. In several cases individuals who had been educated and looked upon as males have suddenly astonished the world by being delivered of children; and, in other cases, malformed men, who have been supposed to be women, have lived for many years as the wives of men, and the fact has not been discovered till death took place. The details of the various malformations which have led to these mistakes, are to be found in most works on physiology.

With respect to the frequency of monsters, so far as statistical accounts have been made, it appears that some kind of malformation occurs about once in three thousand births. We rarely find one anomaly alone. Sometimes the anomalies are of such a kind as to offer no impediment to the enjoyment of health; in other instances they lead to the speedy extinction of life.

Monstrosity is much more frequent in the higher than the lower animals: this fact admits of an easy and at least a very plausible explanation. The more complicated the organisation, the more stages of developement the various organs have to pass through, and the more likely, therefore, is their developement to be interfered with from various causes, than in the simply organised.

The birth of a child of monstrous formation is not usually to be anticipated by the occurrence of any particular symptom during the pregnancy of the mother. When the fœtus is of monstrous formation, the mother, generally speaking, is in good health, and has had well-formed children before. There is scarcely an example on record in which women have produced monsters at their first labour. Occasionally we may suspect that the fœtus in utero is of anomalous structure: for example, parents who are ill-formed are likely to transmit to their offspring the same organic characters which they themselves possess; but we are not to suppose that they cannot have children of natural structure. In some cases a knowledge of the previous pregnancies may afford us useful information. Some well formed persons have a sort of predisposition to give birth to children of anomalous formation, just as some parents who are healthy have a predisposition to give birth to children disposed to particular diseases. Thus, it not unfrequently happens that the offspring of young men and women who appear to be well formed and in perfect health, are all acephalous or consumptive. These facts are not capable of explanation.

Although in many cases no peculiar symptoms precede the birth of a child of anomalous structure, in others the mother, during her pregnancy, especially during the first months, has laboured under disease, or suffered from falls, or other bodily injuries, or powerful moral emotions. In such

cases, it has frequently happened that the health of the mother has been speedily re-established, and there was every reason to hope that no mischievous effects had been produced. In other cases of the kind the mother has suffered more or less from the bodily or mental injury until the period of her labour.

Children who present some slight anomaly in their formation are usually born at the ordinary period of pregnancy, and their delivery is not attended by any remarkable circumstance. But the birth of beings of positively monstrous formation is frequently accompanied by circumstances which deserve attention. The birth of many monsters occurs before the usual period, and sometimes it is retarded beyond the natural term of pregnancy. Double monsters are usually born at the seventh or eighth month of utero-gestation, and, as might be imagined, the act of parturition is generally increased in difficulty. But still it appears that no species of monstrosity absolutely excludes the possibility of natural or manual delivery. The delivery of double monsters is, as might be expected, frequently long and laborious; but St. Hilaire knows of no recorded case of the kind in which the mother has perished during labour, or in which, for the purpose of rescuing her from impending danger, either the Cesarian operation, or embryotomy, was required.

The efficient causes of monstrosity.—Upon this part of the subject writers of the 16th and 17th century gave full play to their imagination, and accumulated many whimsical and absurd hypotheses. Monsters being, in their belief, entirely out of the pale of the general plan and ordinary rules of nature, they were compelled to have recourse to the influence of wonderful causes. Hence those extraordinary births which were attributed to the adulterous connection between men and beasts, from which deplorable and absurd prejudices some paid the price of their liberty, and others of their lives. Hence also the supposed intervention of the Deity, who was thought to create monsters for the purpose of astonishing or terrifying man; or of demons, the origin of evil, placed almost universally after the Deity, by the singular consent of the gross superstition of the people, most of the ecclesiastics, and even the philosophers of various sects. All these hypotheses, the product of the darkness of the middle ages, have long since ceased to have any influence; and even before the idea was maintained that beings of monstrous formation did not depart from the general laws of physiology, no trace of such speculations remained. The opinion gradually arose that both the causes and effects of monstrosity were simple and regular. And such, in fact, is the nature of all those causes of anomalies which have hitherto been proved by observation, and which are generally the hereditary transmission of monsters: diseases which have attacked the mother; violence inflicted upon her, especially upon the abdomen; and lastly, the influence upon the mother of some powerful moral emotion in the first months of pregnancy. St. Hilaire offers many interesting remarks upon some of these cases, and claims for his father the discovery and the demonstration of the remarkable fact, that there are certain monstrosities which are always produced by some mechanical violence inflicted upon the abdomen of the mother; namely, those in which the cranium is open, and in which the brain is deficient, and a vascular tumour exists in place of it. He states, that whenever it has been possible to learn all the circumstances of a pregnancy which has terminated by the birth of children thus monstrously formed, it has always been clearly proved that the mother had either suffered from some violent blow or long continued pressure upon the belly. In the few cases of the kind in which no external violence could be proved, the mother had suffered from some violent moral emotion, the immediate effect of which was a powerful and sudden reaction of the abdominal viscera; or she had suffered from some severe abdominal disease.

I cannot enter into the details of the cases related by St. Hilaire, in proof of his arguments upon this subject; to me they appear clear and convincing.

Connected with the subject of the efficient causes of monstrosities, there

is another question of very difficult solution, and which has long excited the attention of physiologists, viz. the influence of moral impressions of the mother upon the fœtus in utero. The all-powerful influence of this cause would, no doubt, be one of the best proved facts in physiology, if the truth of an opinion could always be inferred from the number of its supporters, or the force of their conviction. In proof of the antiquity of the belief of the influence of the mother's imagination upon the young in her womb, the stratagem of Jacob, to increase the "party-coloured lambs" of Laban's flock, is referred to by all writers. Even in the present day, this doctrine is supported by many writers, and is more or less generally admitted by all classes of society. A few modern physiologists, indeed, have entered their protest against it, and are inclined to exclude, altogether, as an efficient cause of monstrous formation, the moral influence of the mother, which the elder writers regarded as certain and quite satisfactory. There can be no doubt that some anomalies originate from moral motions experienced during the course of pregnancy by the mother; and upon this subject St. Hilaire offers some, at least plausible, remarks. There are various kinds of moral emotions or impressions, no matter whether grave or gay, pleasurable or disgusting. Some are violent and sudden; others weak and momentary; others weak, but more or less permanent. Each different kind of influence upon the mind will produce different effects. This is confirmed by facts. Violent and sudden emotions of the mind very frequently produce as great bodily disturbance as mechanical injuries, and may, no doubt, cause imperfection in the structure of the fœtus. Many remarkable proofs of the truth of this theory are given by St. Hilaire, and numerous writers.

The influence of slight but permanent mental emotions of the mother upon the structure of the fœtus in utero, is not proved by facts equally convincing, but can scarcely be altogether discarded. There are not wanting well authenticated examples of malformed or even monstrous infants given birth to by women who had suffered during their pregnancy from long continued mental despondency and grief. The efficiency of such a cause to produce the alleged effect is too probable to admit of a hasty denial; but further than this we cannot go; we cannot admit the influence of slight and momentary moral impressions of the mother upon the fœtus. According to the popular belief, if a pregnant woman look at a particular object, is disgusted or frightened by it, and, above all, if she "longs" for it, it very frequently happens that the resemblance, both in shape and colour of that object, will be imprinted upon the body of the fœtus; and hence the popular rule, that a woman with child must have all her longings gratified, lest the child should be marked. In support of this belief you will find, in numerous writers, a very imposing array of so-called facts. But examine them closely, and you will also find the evidence upon which they rest is any thing but satisfactory. In cases of this kind the presumed cause of the "mark" or anomalous structure of the child, is never thought of until it is seen at its birth, and then, for the first time, some circumstance or another that occurred during pregnancy, is referred to as the cause of the mark or malformation. Still, as Dr. Blundell says, "in matters of this obscure and uncertain kind, to ridicule, without giving ourselves the trouble to examine, is at once petulant and unphilosophical;" and I refer you to two or three remarkable and authenticated cases, which he has recorded, which show a curious coincidence between impressions made upon the mind of the mother, and appearances upon the body of the child.

Thus, gentlemen, I terminate a confessedly brief and very imperfect sketch of the modern researches upon the subject of monstrosity. I have done, however, all I intended; and, if you will take my advice, as *students* you will go no further into this now very extensive subject. If you are inclined to approach it at a future time, you will find the works of St. Hilaire and Serres, which I have so frequently referred to, by far the most complete. The great and most striking faults of the former are dry and tedious details, fatiguing repetitions, and minute, and, in my humble opinion, very unnecessary divisions.

BIBLIOGRAPHICAL NOTICES.

Tweedie's Library of Medicine.[1]

This is the first volume of the Library of Medicine—edited by Dr. Tweedie—which we announced some time ago. It is intended, that there shall be a series of works on different departments of medical science. The first will comprehend "Practical Medicine," and of this series the volume before us is the first. The second will embrace practical surgery, and the third midwifery, the diseases of women, and the diseases of children, &c.

The other departments of medical science will be treated of in successive volumes.

The volume before us—which is a reprint from the London edition by the enterprising publishers Lea & Blanchard—embraces the following subjects and authors. An introduction on general pathology, by Dr. Symonds; inflammation, by Dr. Alison; general doctrines of fever and continued fever, by Dr. Christison; plague, intermittent fever, remittent fever, and yellow fever, by Dr. Shapter; infantile gastric remittent fever and puerperal fevers, by Dr. Locock; smallpox, by Dr. George Gregory; measles and scarlatina, by Dr. Burrows, and diseases of the skin, by Dr. E. Schedel.

It would appear, from the advertisement of the American publishers, that the subsequent volumes—some of which have been received—will appear in quick succession "should sufficient encouragement be afforded." We sincerely trust, that no difficulty will be experienced on this head. A work like the present—each volume, by the way, complete in itself—should be in the hands of every one who can afford it. Without the appearance of such productions from time to time, it is indeed difficult to keep pace with the changes and improvements that are taking place in pathology, and therapeutics, and he who would remain a routinist, unenlightened by the observation and reflections of others, must consent to be thought a laggard, and far inferior to his more industrious and enterprising brethren.

We can strongly recommend this series to the attention of all; not simply of the young, but of him who has grown gray in the service; and—as is too often the case perhaps—prides himself upon his own information derived from his individual experience, when a brief reference to works like the one before us would have spared him much strife after originality, and showed him the fallacy of many of his own inane speculations, and, possibly, inert or injurious therapeutical practices.

[1] Dissertations on Fevers, general pathology, inflammation and diseases of the skin. By J. A. Symonds, M. D. Physicisn to the Bristol General Hospital, Lecturer on the Practice of Medicine at the Bristol Medical School, &c.; W. P. Alison, M. D. F. R. S. E., Professor of the Institutes of Medicine in the University of Edinburgh; Robert Christison, M. D., Lec. R. S. E., Professor of Materia Medica in the University of Edinburgh, and President of the Royal College of Physicians, &c.; H. E. Schedel, M. D., Paris; Charles Locock, M. D., Consulting Physician to the Westminster Lying-in-Hospital, &c.; George Gregory, M. D., Physician to the Small Pox and Vaccination Hospital, &c.; George Burrows, M. D., Assistant Physician and Lecturer on the Practice of Medicine at St. Bartholomew's Hospital, &c.; Thomas Shapter, M. D., Physician to the Exeter Dispensary, &c. Edited by Alexander Tweedie, Fellow of the Royal College of Physicians, Physician to the London Fever Hospital and to the Foundling Hospital, &c. Large 8vo. pp. 561. Philadelphia, 1840.

MISCELLANEOUS NOTICES.

Jefferson Medical College of Philadelphia.[1]—The published announcement of this institution contains an exposition from the faculty of the wholesome condition of the school, with an address from the Board of Trustees, who express their conviction "that at no time has the school been more effective, or more in a condition to fulfil the warmest hopes and expectations of its friends," that it "now presents advantages unsurpassed by those of other institutions," and that they feel satisfied "the institution is admirably calculated for a career of extensive and enduring prosperity." For the list of Professors, &c. we refer to the cover of the Journal.

To the announcement are appended the names and residences of *eight hundred and thirty-two individuals*, who have received their degrees from the institution.

Albany Medical College.—The catalogue and circular of the Albany Medical College, contains the names of 73 students, and 17 graduates for the session of 1839–40.

Digestive Organs of Infusoria.[2]—After careful microscopical observations of the digestive organs of infusoria, M. Meyen has arrived at the conclusion that the rounded bodies seen in these animals, particularly after the ingestion of coloured food, are not cœcal pouches, or stomachs continuous with the alimentary canal, as described by Ehrenberg, and believed by many able physiologists; but that they are isolated globules of ingested substance; moving freely in the abdominal cavity, and unrestrained by membranous parietes. These globular bodies were first noticed by Gleichen in 1781, after feeding infusoria with indigo and carmine, when he observed that the particles of each substance formed in a very short time globular masses in the interior of the animals. Ehrenberg thought he could trace a flexuous intestine along the course of these globules, which he has delineated in his splendid work. More recent observers have failed in their search for this intestine, but have seen the globules changing their position, and sometimes making a complete revolution along the internal parietes of the animal. M. Meyen explains their formation in the following manner. He says, that the particles attracted towards the buccal orifice by the action of cilia, are conveyed along the œsophagus to the stomach, where they are collected into a globular ball, and surrounded by a mucous secretion; that the stomach opens abruptly into the abdominal cavity without an intestinal prolongation, and into this cavity the balls are protruded, being connected with each other by the mucosity surrounding each successive globule; that when the abdominal cavity is filled with these balls, they are expelled through the anal orifice. The sacs which are seen in other infusoria are not, according to M. Meyen, stomachs, but cœcal cavities containing fluid, varying in size, appearing or disappearing under the eye of the observer, and having no communication with the exterior. They resemble cavities which are formed in the mucus of true cellular plants, particularly aquatic cryptogamia. If these views of M. Meyen should be verified by other investigators, and be found correct, the term polygastrica as applied to the class of infusory animalcules, will require alteration.

[1] Jefferson Medical College of Philadelphia. Annual announcement of Lectures for the session 1840–1, with a catalogue of graduates of the institution. 8vo. pp. 16. Philadelphia, 1840.

[2] Abridged from the Edin. New Phil. Jour. in Lancet, May 16, 1840, p. 287.